



Guided surgery accuracy for implant placement in the posterior area.



DDS.Denis Flores Posada; DDS. Victor Manuel Soto

Initial presentation.

A 49-year-old patient presents with a 6-year history of Sjögren's syndrome (SjS). The oral examination reveals a gingival thick-scalloped phenotype and absence of tooth #46. According to Misch's classification, a D1 cortical bone density with a value of 1394 HU was determined. Ridge deficiency was categorized as a Class I alveolar defect according to Seibert's classification.

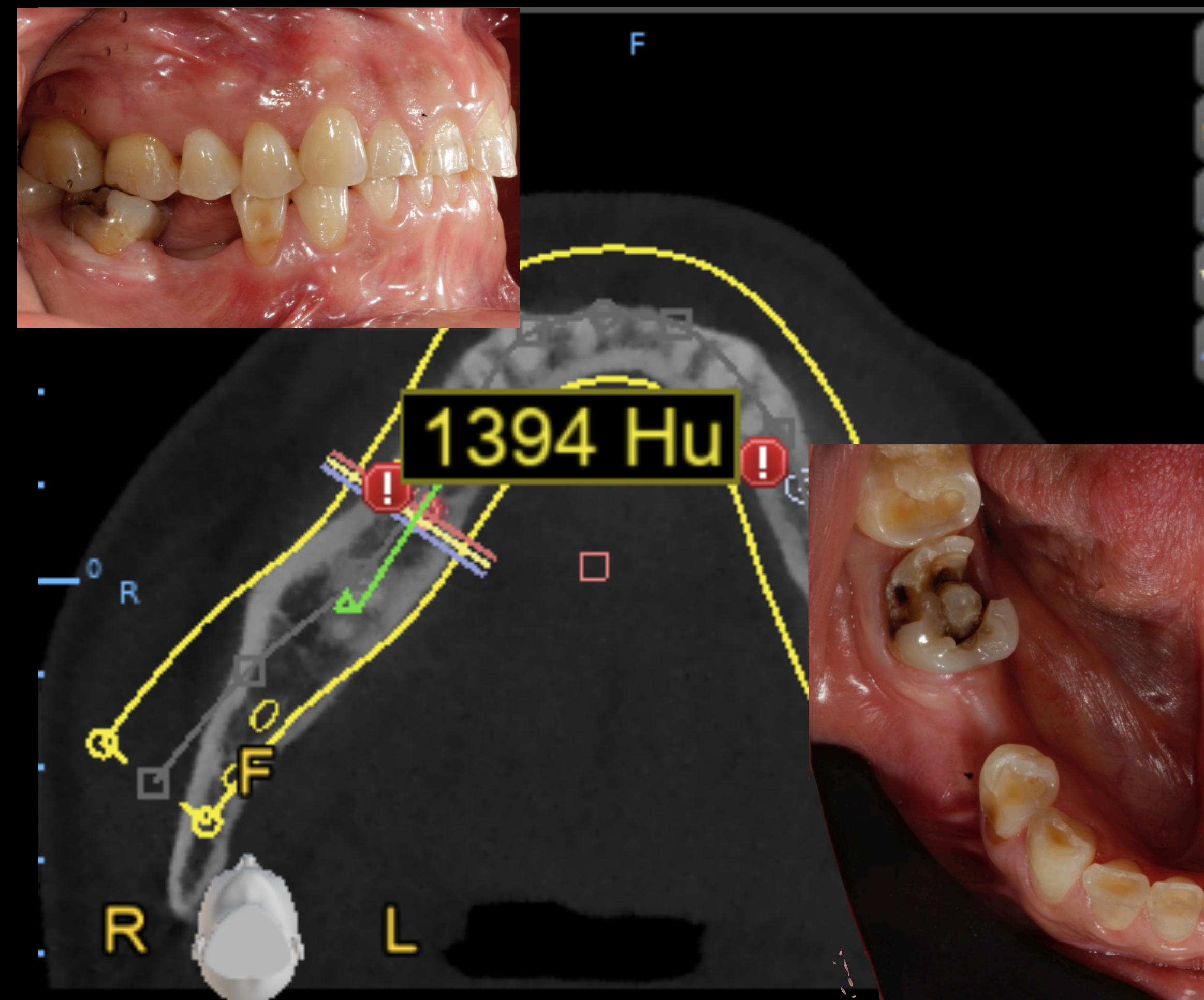


Fig.1 Examination inicial. According to Misch's classification, a D1 cortical bone density of 1394 HU.

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Methods.

A virtual planning for the surgical field was performed with the 3D software, which determined to place an implant with a diameter of 4.3 mm and a length of 10 mm Fig.2. A rigid guide was obtained from the virtual planning through rapid prototyping with stereolithography (SLA) Fig.3. For the surgical procedure, a full-thickness flap was reflected, and the surgical guide was properly seated. Drilling was performed through tube adapters, reaching a 4.3 mm diameter and a length of 10 mm. Following implant placement, allograft and xenograft regenerative biomaterials (particle size of 200-600 microns) and a collagen membrane (20 mm x 30 mm) were placed in the surgical site.

Fig.3 The transfer of the virtual planning to the surgical field was conducted with rigid guide obtained through rapid prototyping with stereolithography (SLA).

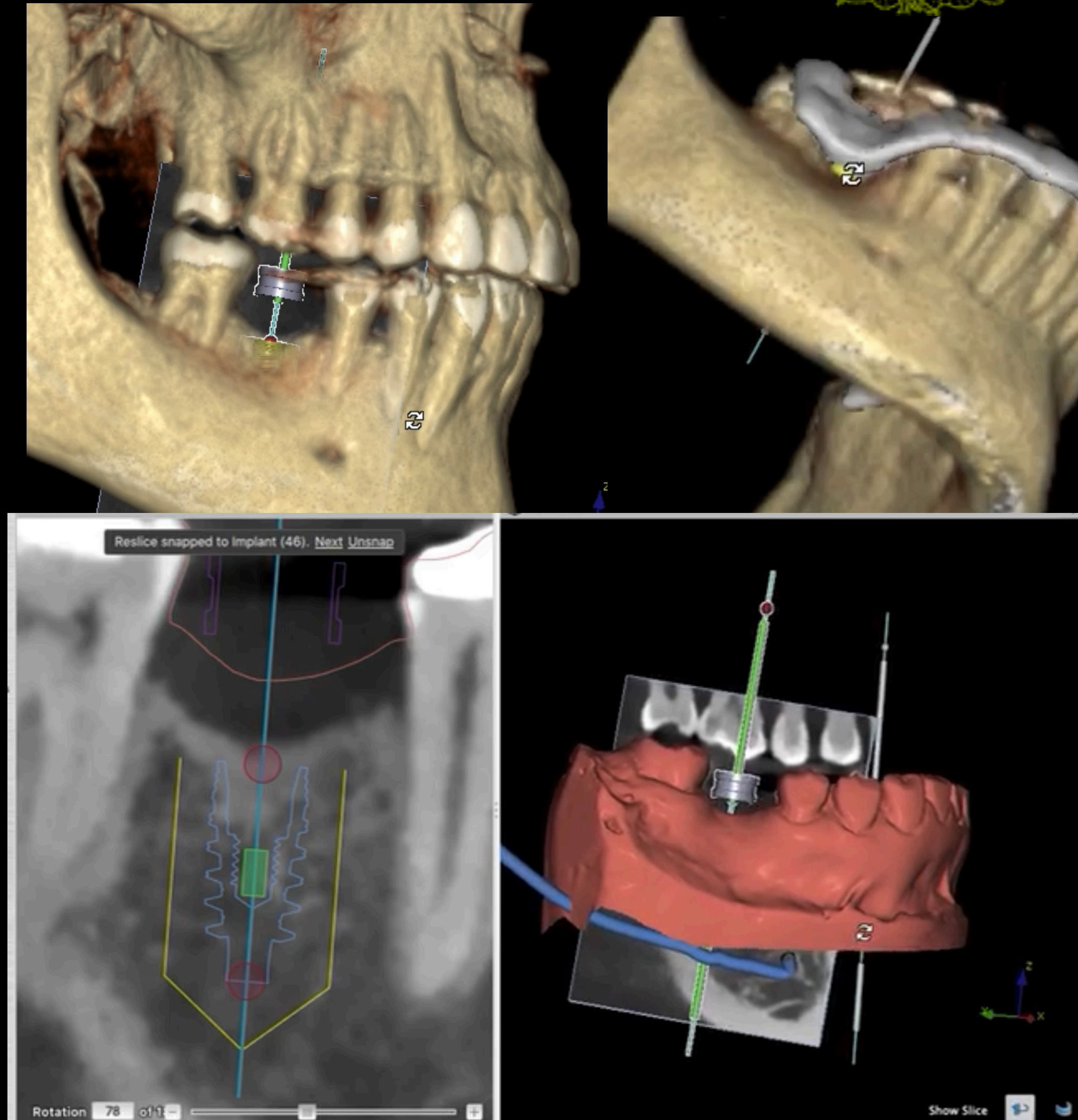


Fig. 2. Virtual planning with CBCT imaging and image reproduction from lower jaw model [STL file] are matched with the aid of the 3D software (left). During implant virtual planning it was determined to perform bone regeneration simultaneous to implant placement.



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Results:

Surgical reproducibility is achieved from the virtual planning in terms of the accuracy. Deviation at the level of implant entry was 1 mm and at the tip of the implant was 1.45 mm. The average angular deviation was of 3.90 degrees (Fig. 3)

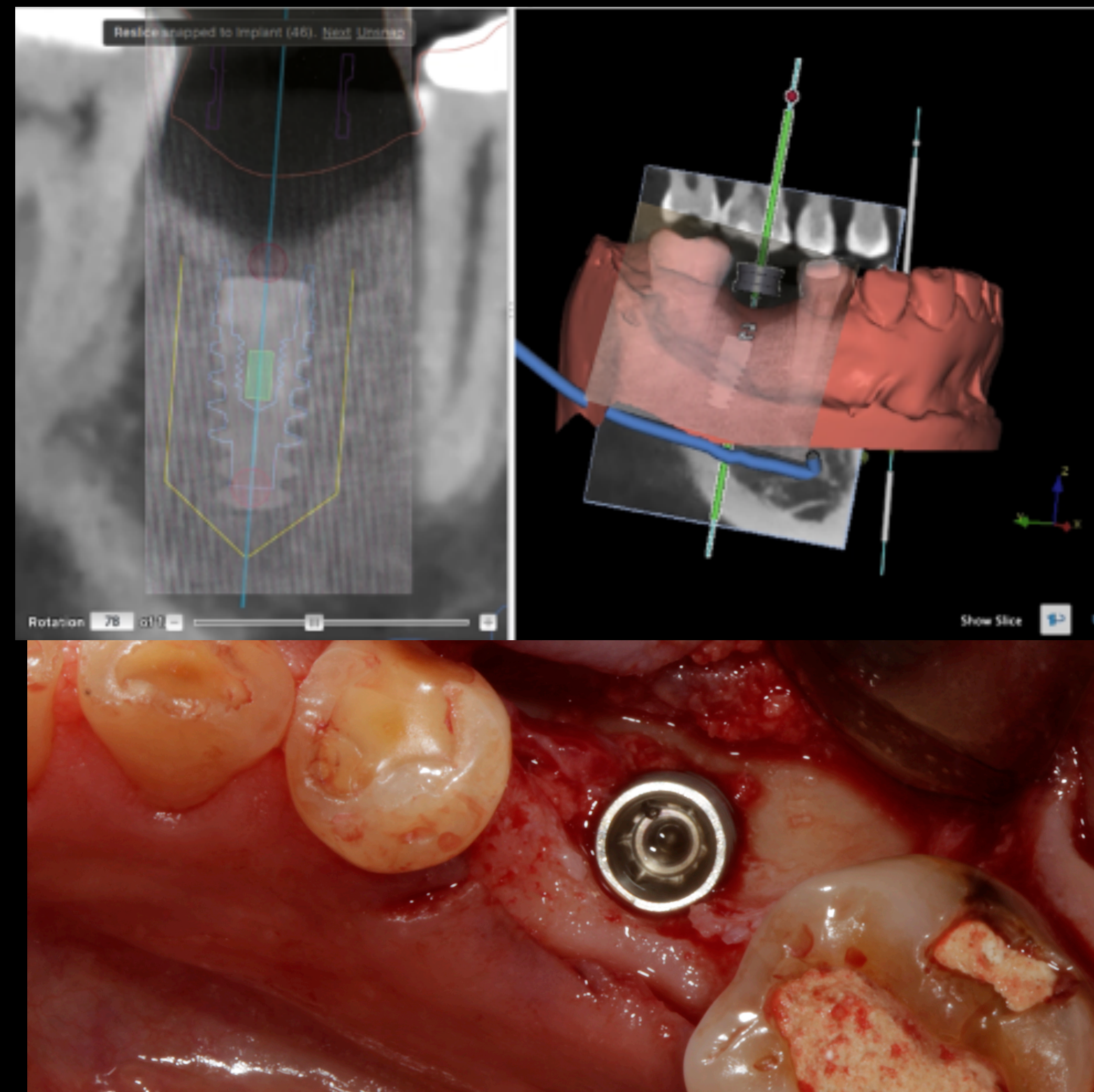


Fig.3 Implant final position (radiographically, topographically and surgically).



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DISCUSSION

Guided surgery accuracy for implant placement is within the acceptable range in most of the clinical situations. However, a safe distance of at least 2 mm must be respected. The reported survival rate for 1,941 implants placed with guided surgery was 97.3% according to a review. Ali et al. 2017. An increased accuracy was found when partially edentulous patients were treated compared to completely edentulous patients due to the support provided by the remaining teeth. An increased accuracy in the anterior zone was found compared to the posterior zone. A wide variety of factors may contribute to deviations in the implant real position and the implant final position. Such factors include mouth opening, guide sterilization, errors during model scanning and CT scanning, as well as the offset.

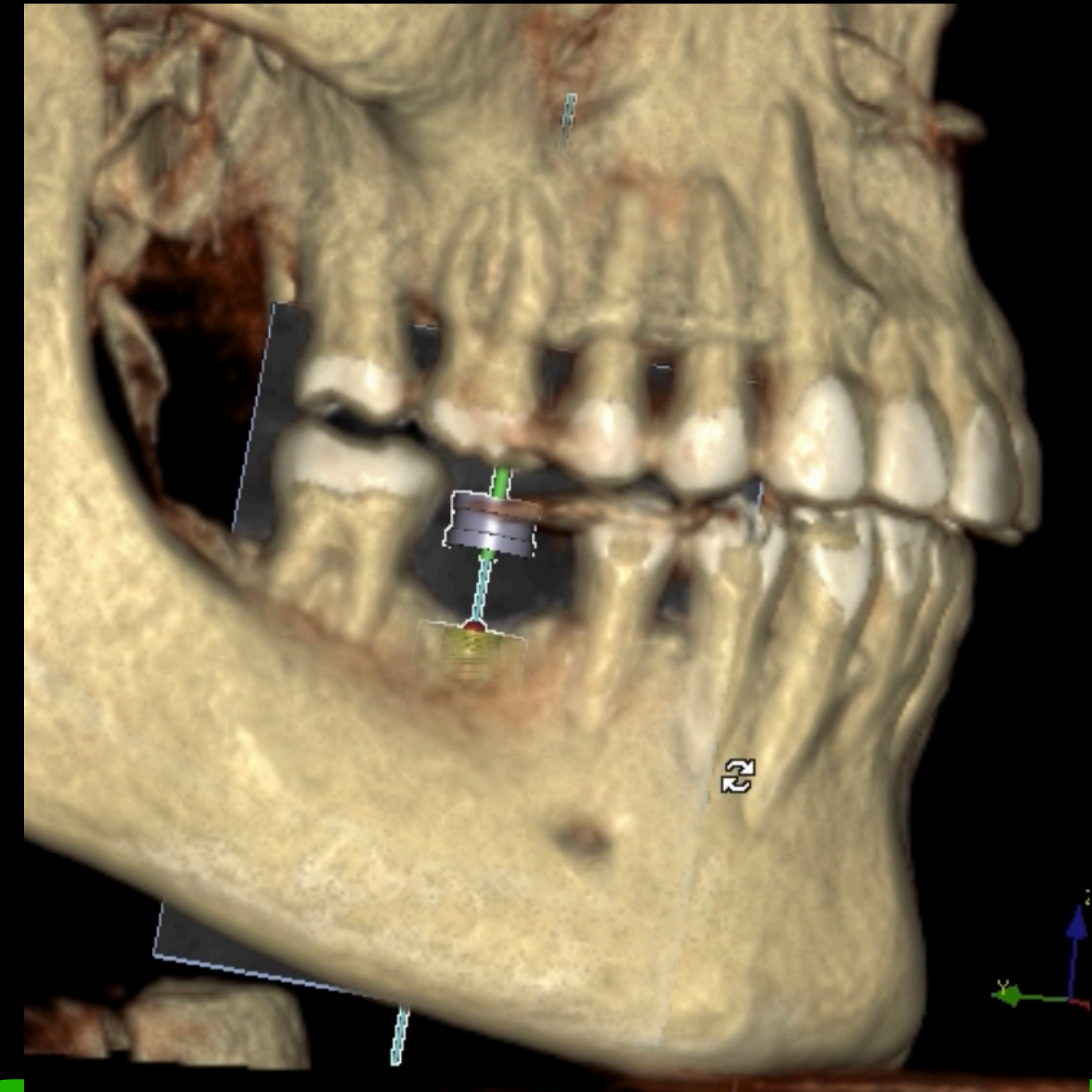


Fig 4. Guided surgery provides a virtual surgical planning with the use of a specific software and a CBCT scan.



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Conclusion:

Surgical reproducibility was achieved from the virtual planning in terms of the accuracy. Deviation at the level of implant entry was 1 mm and at the tip of the implant was 1.45 mm. The average angular deviation was of 3.90 degrees and the implant final position. The factors was influenced mouth opening, p and guide steam sterilization. Patients with SjS,report on relatively high implant survival . Payne et al. with a success rate of 88.4% and Isidor et al. reported a success rate of 84% in patients and follow-up of 4 years .

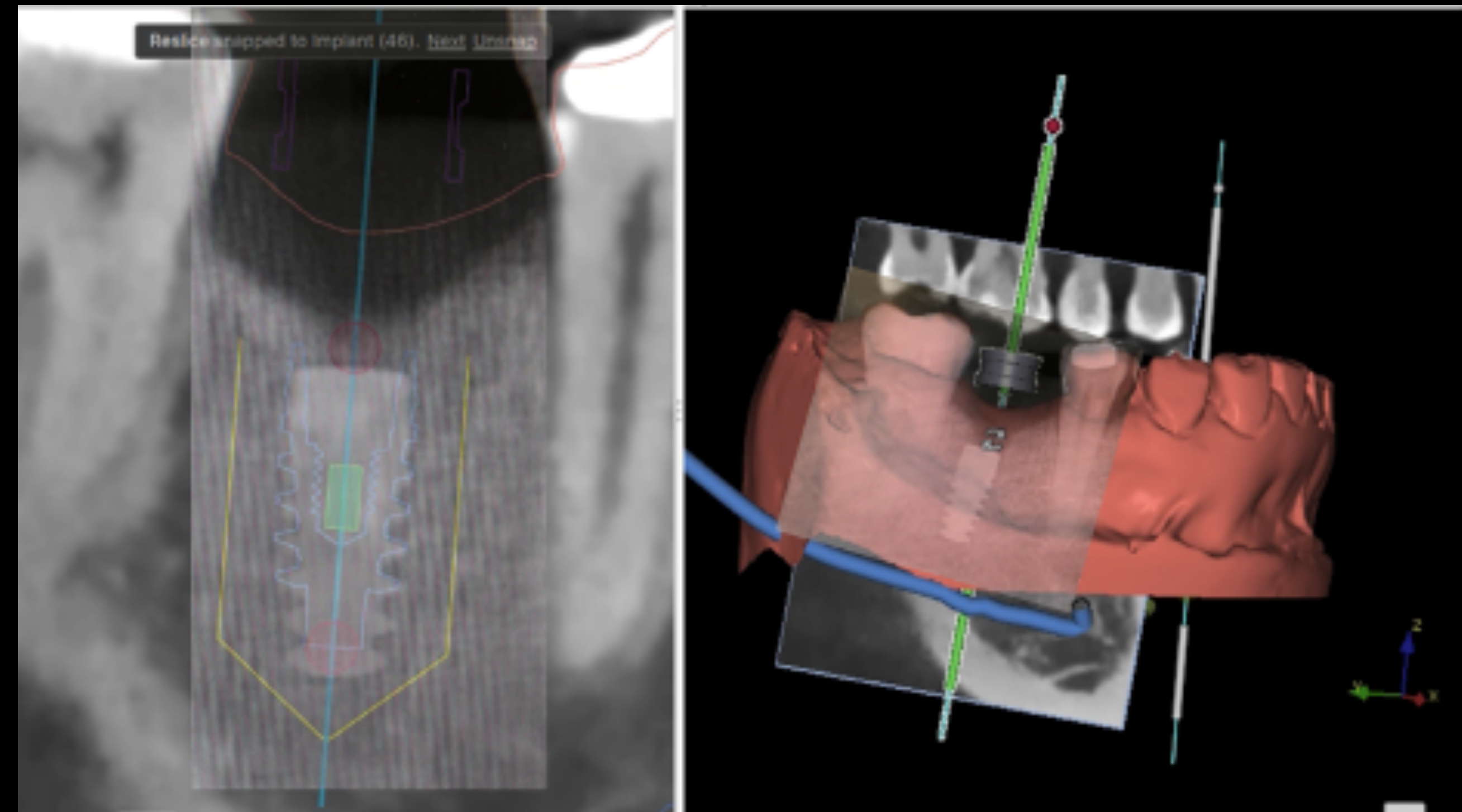


Fig.5 Final position of the implant